

Motion sensor: Increase your activity for a healthier lifestyle

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Credit: Fraunhofer

People are increasingly leading a sedentary lifestyle that may lead to weight gain issues; efforts are being made across Europe to encourage people to become more active and as a result, healthier. Researchers at the Fraunhofer Institute in Germany have taken up the challenge and have now developed an interactive learning system that aims to encourage and motivate the user to move about more - but in a playful way. The researchers have combined a sensor mat with an activity monitor into a system that both children and adults can use to stay fit and learn at the same time. The highlight: the system records the intensity of the physical activity and immediately displays it.

There is no denying that [physical activity](#) is extremely important for both

young and old. Statistics show that people who exercise regularly are healthier, are rarely overweight and have increased power of concentration. The inspiration for this new system came to Dr Martina Lucht, a media scientist at the Fraunhofer Institute for [Digital Media Technology](#) (IDMT) in Ilmenau, when she came across a hopscotch grid drawn on the street. HOPSCOTCH, as the system is now called, consists of a [sensor mat](#) that is subdivided into nine fields; each field has several letters and a number in it. The mat is connected to a monitor via a cable, and tasks from various fields of knowledge are displayed on the monitor. In order to complete the task, the user presses on the fields of the sensor mat in the correct order and enters words or numbers. The researchers believe that the design of the interactive learning system HOPSCOTCH can inspire every age group can use it to stay physically and mentally fit, in a playful manner.

Dr Lucht and her team worked closely with researchers at the Fraunhofer Institute for [Integrated Circuits](#) (IIS) in Erlangen to further develop HOPSCOTCH. ActiSENS, a [motion sensor](#) that measures physical activity, developed by Fraunhofer IIS, was added to the system. ActiSENS registers all of a person's movements, records their intensity, and then rates them. The module determines whether the user simply tapped the fields with their foot or actually jumped and hopped on them. The feedback is displayed on the monitor in real time using five bars. 'It doesn't just matter whether or not the task was completed, but also how. ActiSENS tells the user whether or not they have moved enough,' explains Martin Rulsch, a computer scientist at Fraunhofer IIS. 'The goal is to motivate the user to move more and have fun.'

The small sensor is housed in a box that is hooked to the user's belt. The data is read in real time and transmitted via Bluetooth to a terminal device, such as a television. 'But a cell phone can also be used as an output device,' says Rulsch. The data can also be saved to a flash memory and transmitted to a PC later to evaluate it.

The concept's possible areas of applications are varied: in schools it can be combined with language and gym classes - this doesn't just benefit overweight or hyperactive children. Studies have shown that there is a growing number of students who can no longer perform simple tasks such as walking backwards or standing on one leg, due to a lack of physical activity.

But older adults in rehab centres and retirement or nursing homes can also profit from the innovative movement concept. It can be used in parallel with physical therapy, for example, to train muscles after operations. ActiSENS accurately calculates net movements and the level can be modified to the individual's endurance, which prevents it from over- or under-challenging the individual. The researchers at Fraunhofer IIS and Fraunhofer IDMT will be presenting their system at the MEDICA 2012 trade fair in Düsseldorf from 14 to 17 November at the Fraunhofer joint booth in Hall 10, Booth F05.

More information: www.medica-tradefair.com/

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